vol. II no. 9

May, 1943

School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

Schools Train 4 Million Workers
by Layton S. Hawkins

Austin Takes to the Air
by Guy O. Tollerud

Shoe Scrapers from Old Bed Rails
by Einar E. Siro

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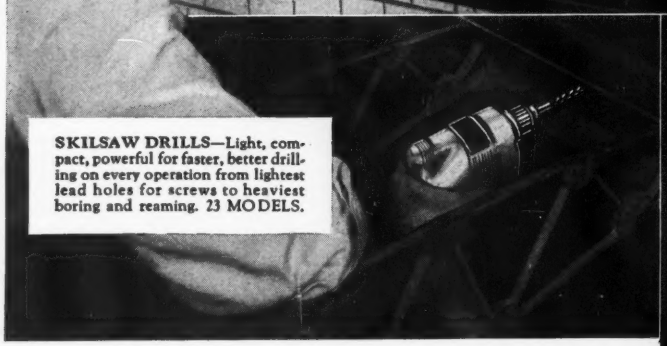

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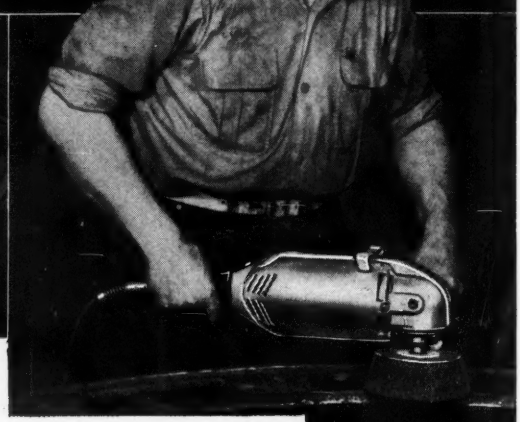

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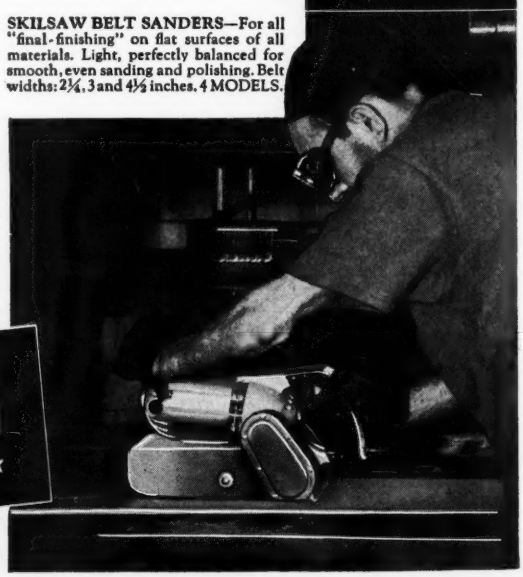

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Watch for the June Issue!

The June number will be an invaluable aid to shop teachers and supervisors! In addition to the regular features of SCHOOL SHOP, this number will contain an inclusive, accurate, and up-to-date directory of manufacturers and suppliers of equipment and lists of federal and state officials in industrial education.

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School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

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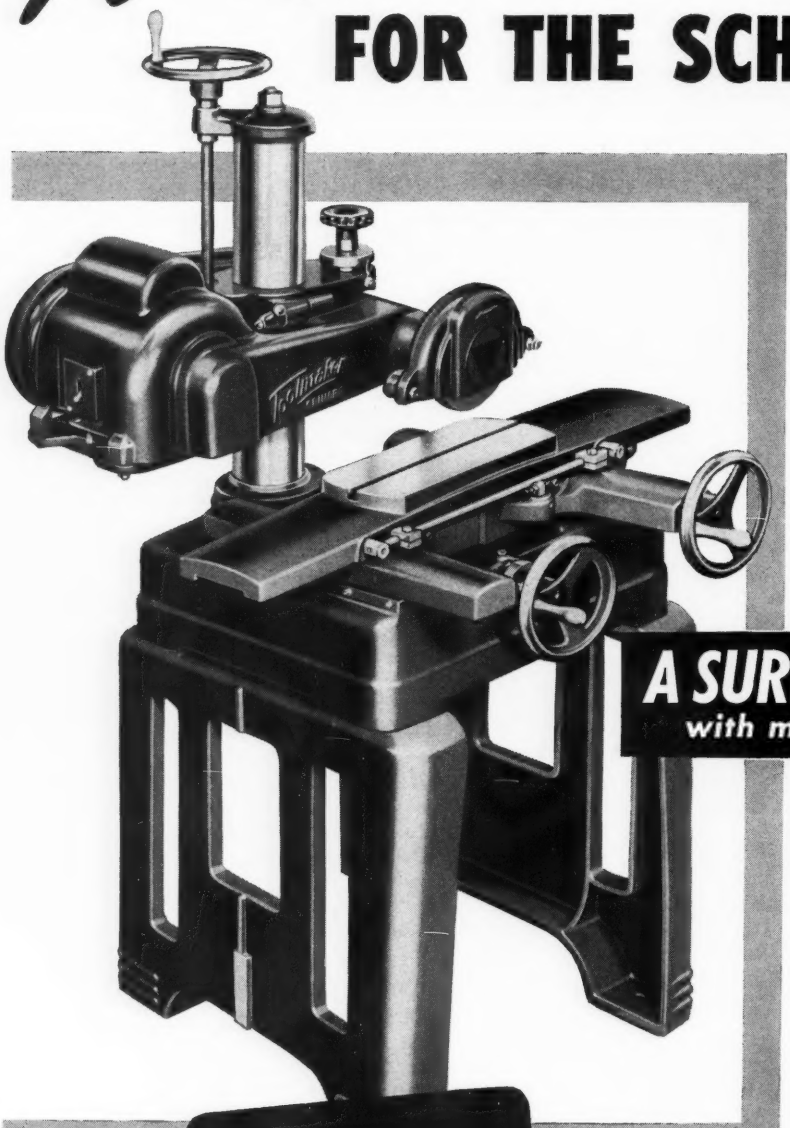
A New Machine
FOR THE SCHOOL SHOP



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Lathe-operator trainees learning war-production skills at Connelley Vocational High School, Pittsburgh, Pennsylvania.

Schools Train Four Million War Workers

BY *Layton S. Hawkins*

MANPOWER alone is not sufficient if this country is to produce more and better planes, ships, tanks, and guns than the Axis nations can produce. A considerable proportion of the necessary manpower must be trained. It must be trained in specific skills which are required on the production lines. The purpose of the program of Vocational Training for War Production Workers, in which the United States Office of Education and the public vocational schools in every state are cooperating, is to provide the necessary training. It has been doing that job now for more than two and one-half years. Today the vocational schools are providing training for men, women, and youth in hundreds of communities.

Many hundreds of thousands of men —and women—trained in the public vocational schools are at work in aircraft factories, shipyards, and armament factories. During the first 30 months of the operation of the vocational training program, approximately 4 million men and women received pre-employment, refresher, or supplementary training in the vocational schools. From the inception of the program in July, 1940, to December 31, 1942, 1,995,000 persons were enrolled in the supplementary courses and 2,023,000 were enrolled in the pre-employment courses. By far the bulk of the training has been for occupations in the aircraft, shipbuilding, and machinery-production industries.

This is the amazing story of a prodigious job accomplished and being accomplished by school shops from coast to coast. Here in SCHOOL SHOP the National Director of Vocational Training for War Production, Mr. Hawkins, summarizes accomplishments to date.

Federal-State Cooperation

The program of Vocational Training for War Production Workers is a part of the overall labor-supply program, which is carried on under the general direction of the War Manpower Commission. It contributes to the solution of the manpower problem by providing systematic vocational training to workers preparing to enter employment in war industry, and to workers already employed in war jobs who need additional training.

The training program in the public vocational schools is currently conducted under Public Law 647, 77th Congress, 2nd Session, which appropriated 94

million dollars for the cost of courses. The actual training of workers is done by the states and the local school systems. They cooperate with the United States Office of Education, which certifies funds for training and establishes broad training policies. The program is conducted currently in approximately 1500 cities and towns.

The vocational schools are conducting training in close cooperation with regional and area offices of the War Manpower Commission, the United States Employment Service, and with state and local advisory committees made up of representatives of management and labor equally. The principle of democratic, federal, state, and local responsibility is the outcome of a quarter of a century of experience dating back to the enactment of the Smith-Hughes law, which provided federal grants to the states for vocational education in the nation's public schools.

Kinds of Training

In classifying the kinds of training offered in the public vocational schools the line of demarcation is whether the worker is either unemployed or engaged in a nonessential industry on the one hand, and on the other hand, whether he is currently on the payroll of a war industry.

If the worker-trainee is either unemployed or engaged in a nonessential industry he is considered a pre-employment trainee. Pre-employment courses aid in the solution of many problems arising out of labor-supply stringencies. In all cases, the major objective is training for a specific skill in a specific industry and in many instances for a specific plant. It is probable that at this stage in the development of the war-time labor market the most important purpose that pre-employment training serves is to prepare workers, primarily women, who never before have been engaged in gainful employment. These new workers, in addition to acquiring the requisite manipulative skills, must also be conditioned to working in large factories. Such conditioning, it has been found, facilitates to a considerable extent, the process of adjustment to factory life which is essential if these new workers are not to account for a substantial turnover after they secure employment.

A second purpose which pre-employment courses serve is to effect the transition of many workers from occupations in peacetime goods-producing industries and trades to the discipline of war-time industrial occupations. Thus, gasoline station attendants and bell boys, to cite a few outstanding illustrations, are acquiring basic specific skills as aircraft riveters, ship welders, and machine operators in other essential war occupations during the hours when they are not engaged in their regular employment.

A final purpose, less important now than it was at the inception of this program is the training for persons who are normally in the labor market but currently unemployed. The obvious reason for the decline of this group is to be found in the fact that unemployment has been reduced to a practical minimum. This last kind of training was of much greater importance when there existed a substantial pool of unemployed with skills which had become rusty from disuse but which could be "refreshed" after a period of training.

Learning foundry practice at Metropolitan Vocational High School, New York City, under the VTWPW program.

Supplementary Training

The major objective of the supplementary courses is also the training for particular skills or knowledge. The most important aspect of the supplementary courses is the training which they provide for the purpose of advancing workers from the lower levels of skills to more complex jobs. With the supply of workers experienced in the higher skilled brackets completely exhausted, employers must of necessity recruit the workers in this category by what has come to be known as "upgrading."

The crucial importance of supplementary training of this kind lies in the fact that the prevalence of stringencies in a relatively few highly skilled jobs prevents the employment of a much larger number of workers in the occupations requiring a lesser degree of skill. Training lathe hands, milling machine hands, or other machine-tool operators to become machinists and special purpose

welders to become all-around welders are illustrative of this upgrading process in which supplementary courses during out-of-work hours play an important part. The application of blueprint reading, shop mathematics, and precision measuring instruments to specific plant jobs are also taught in these supplementary courses.

War-industry employers are increasingly following the practice of taking on "green hands," who have had no previous training or experience. But instead of putting them on production at once, these employers are assigning such workers to full-time attendance in the public vocational schools. These schools provide training which is completely geared to the specific needs of the employers. Two factors are responsible for this special trend in supplementary training. In the first place it is becoming increasingly difficult to recruit trainees unless such trainees receive a wage sufficient to pay for their upkeep while in training. Secondly, experience has demonstrated that systematic training procedures are much more effective in bringing workers up to full production capacity than are "hit-or-miss" or "pick-up" methods on the job.

Because so many workers who are new to industry have been hired, it has been necessary in many cases to increase the proportion of foremen and supervisory workers employed. The schools have helped to instruct many thousands of new supervisors on the best methods of teaching workers how to do their jobs.

During the first period of the war, with large numbers of men looking for work, women were not hired in appreciable numbers, but as manpower requirements of war industry and the armed forces rose, women began to be employed in steadily increasing numbers. The number of women in training in war-production classes was relatively small as long as they were not hired in large numbers. Women now represent a high proportion of enrolment in training classes. The vocational schools have set up standards of safety for training of women, stressing safety in dress, such as the use of hair covering, proper shoes, and proper dress or slacks and other safety measures.

From July 1, 1942, to December 31, 1942, 235,627 women or 37.4 percent of total enrolments were enrolled in pre-employment courses, and 121,252 women or 19.7 percent of total enrolments were enrolled in supplementary courses.

Results of Training

Some of the more important results of the program of Vocational Training for War Production Workers are as follows:

More than one million men and women were given training in specific skills required in the aircraft industry.

More than one million men and women have been given training in the operation of machines used in war industry.

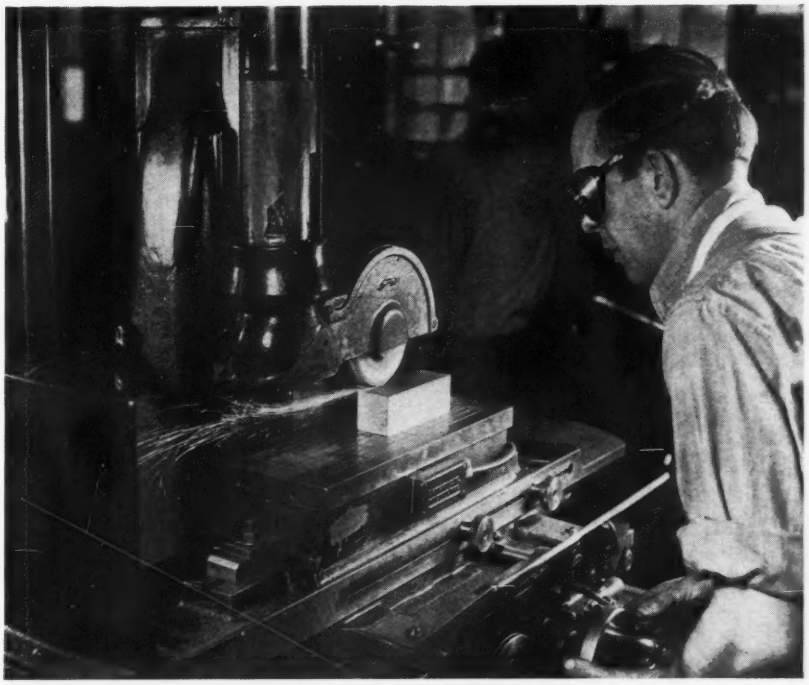
Approximately six hundred thousand men and women have been given training in skills used in the construction of ships.

Tens of thousands of automobile mechanics have been given "conversion" training for jobs in war industries.

Many thousands of nonemployed workers, former "white-collar" workers, salesmen, and nonmechanical workers of all types have received training in the schools.

Thousands of Civil Service "mechanic learners" have been trained for the United States Army Air Service Command and for the United States Army Signal Corps.

The schools are continually cooperating with war-production industries by setting up special training programs where they are required. The schools have expanded school facilities and equipment for the aircraft and shipbuilding industry in hundreds of localities; they have set up welding testing laboratories, developed instructional materials, including course outlines, in principal aircraft and shipbuilding occupations, and conducted training for foremen and leadmen in dozens of training centers.



Trainee in a Detroit school shop learning the operation of a surface grinder preparatory to war-production employment.

The schools are working closely with both the United States Army and the United States Navy in the training of civilian workers for shore establishments and in some cases are training enlisted personnel in mechanical subjects. The air-transport companies are being assisted through the training of large numbers of men and women in numerous mechanical occupations.

In brief, the vocational schools are providing every sort of training possible in order to equip men and women with the skills necessary to "Keep 'em Rolling" and "Keep 'em Flying."

Watch for the June

School Shop!

Next month's number will be a specially valuable issue for it will contain an up-to-date directory of suppliers, lists of federal and state officials and organizations, and the usual practical features. You will want to keep the June number for reference throughout 1943-44.

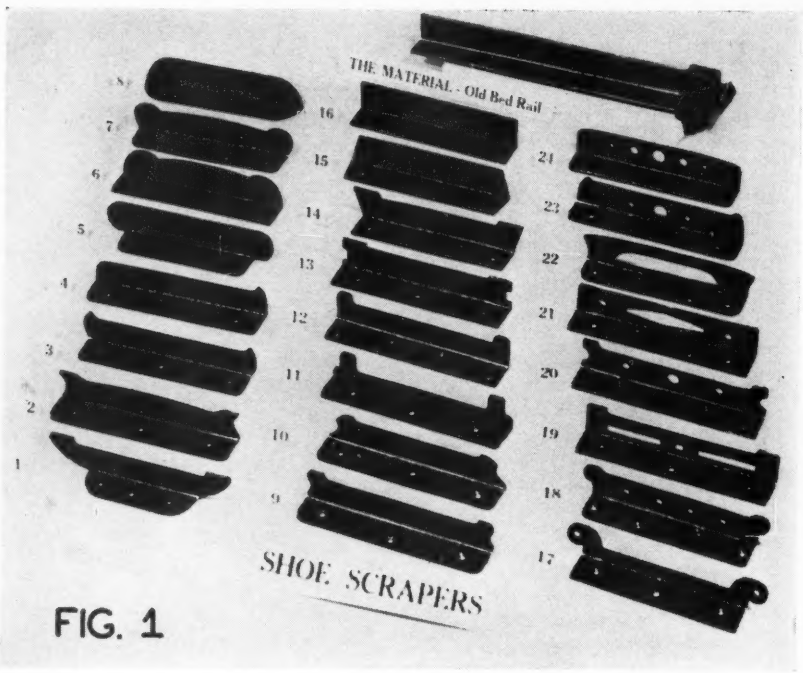


FIG. 1

Project of the Month:

Shoe Scrapers FROM OLD BED RAILS

BY **Einar E. Siro**

This timely, practical project illustrates the conservation of materials and includes essential basic pre-induction operations in metal-work. It is adaptable for training students of all ages. The author formerly taught in Minneapolis, Minnesota, but now is at Fort Knox, Kentucky.

Twenty-four Variations on the Shoe-scraper Theme

TESTED 66 INSTRUCTIONAL PROJECT

WITH the growing scarcity of rubber and metal door mats the shoe scraper will gain in popularity, particularly in suburban and rural areas. It will be especially appreciated by the farm and garden workers.

Sturdy, inconspicuous, and neat shoe scrapers can be made easily out of old bed rails. A variety of designs that can be readily adapted to meet the interests and abilities of the students are possible. The use of salvaged material involves little or no expense, and helps to solve the instructor's problem of securing material. The construction of the scraper, depending on the design chosen, will include a number of fundamental operations in metal-work such as: designing and laying out, center punching, drilling, grinding, filing, countersinking, sawing of metal, removing metal with a cold chisel, finishing inside and outside surfaces, and the painting of metal. Best of all, it is a practical project students like to make.

Twenty-four "shop tested" shoe scrapers made out of old bed rails are shown in Fig. 1. The details of construction of these scrapers appear in part *A* of Fig. 2. In part *B* of Fig. 2 are layouts for six additional scrapers showing the possibility of having a name, initials, house numbers, favorite symbols, or the year indicating the construction date of the scraper or dwelling worked into the design by drilling small holes. In part *C* of Fig. 2 are six layouts for bases. These layouts include the holes for the screws or bolts that will be used in fastening the scraper in place.

Although all the scrapers shown in Fig. 1 and 2 are made out of old bed rails (1½" angle iron), any other angle iron of suitable size may be used. The shoe scrapers described in this article are 8" long. However, the length may be changed to fulfill the individual's need.

Before designing a shoe scraper or choosing one of the designs shown, there are several things to note in order to be assured of incorporating the specific features you desire in your project. The shoe scraper as here discussed is considered to consist of three main parts: (1) blade, (2) vertical up-right, and (3) the base. Study Fig. 1 and 2 while you consider the following characteristics of shoe scrapers:

1. Some of the blades are straight across the top; others are either a little concave or convex. This slight variation is a matter of choice.

2. Some are designed with vertical uprights at the end of the blade to facilitate removing dirt from the sides of the sole.

3. The top or scraping edge of the blade is ground or filed flat to avoid damaging the sole, heel, or any other part of the shoe.

4. The design of the base matches the design of the blade.

5. Provision is made for fastening the scraper securely in place. The method and material to which it is to be fastened should be determined beforehand. This will determine the number and size of the holes to be drilled in the base. When flat-head wood screws or stove bolts are used for fastening, it will be necessary to countersink for the heads. This is not necessary when lag screws, round-head wood screws, or round-head stove bolts are used.

6. The scrapers are painted to avoid rusting and to improve the appearance. The scrapers in Fig. 1 were finished with black paint. Any other dark color that goes well with the color of the dwelling is desirable.

To layout a shoe scraper full size, rule off a sheet of paper into ½" squares and then sketch the outline using one of the designs in Fig. 2 for a guide. The squares will simplify the procedure in arriving at the correct proportion and design. Layout an appropriate shaped base in the same manner. Refer to part *C* of Fig. 2.

Before starting to work it is advisable for the student to write a step-by-step plan of procedure that includes a list of materials, tools, and equipment needed. A written plan saves time. It also reduces spoilage of material and helps to develop the habit of doing one's work in an orderly manner. A guide for the preparation of a plan of procedure follows:

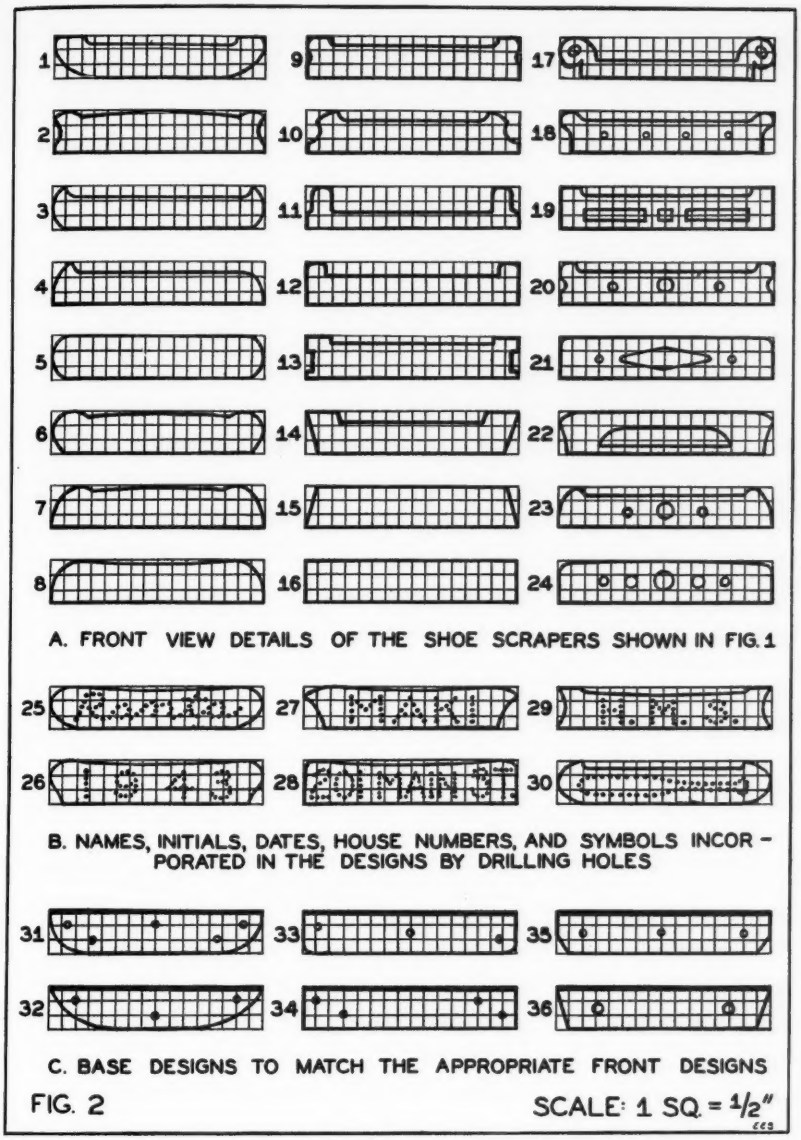
PLAN OF PROCEDURE FOR MAKING SHOE SCRAPER

(Have finished plan checked by instructor)

A. MATERIALS
(List all materials needed to complete the job)

B. TOOLS AND EQUIPMENT
(List all tools and equipment needed to make the shoe scraper.)

C. PROCEDURE
(Write a step-by-step procedure under each of the following headings.)


A. FRONT VIEW DETAILS OF THE SHOE SCRAPERS SHOWN IN FIG. 1
B. NAMES, INITIALS, DATES, HOUSE NUMBERS, AND SYMBOLS INCORPORATED IN THE DESIGNS BY DRILLING HOLES
C. BASE DESIGNS TO MATCH THE APPROPRIATE FRONT DESIGNS
FIG. 2
SCALE: 1 SQ. = 1/2"

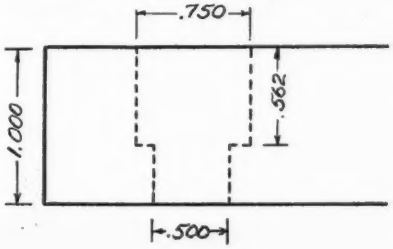
1. Layout scraper.
2. Secure and cut material to length.
3. Transfer pattern on to the material.
4. Make inner design in blade. (See shoe scrapers 17 through 30.)

(This step is omitted if a scraper is made without inner design or "piercing.")

5. Shape outer edges of the blade.
6. Shape the base.
7. Layout and drill holes for fastening.
8. Apply finish.

A METHOD OF CHECKING A COUNTERBORING TOOL

JUST recently we had a problem of counterboring 12 holes in cast iron to .750 of an inch with no tolerance. A hole had been drilled and reamed to .500. On a test piece the counterbore made a hole varying from .754 to .757. A new pilot did not improve the situation. Taking a rough measurement with a micrometer from one side of the pilot to the top of a lip suggested that the three lips of the counterbore were not concentric. The counterbore was put in the lathe and the pilot hole tested for concentricity with a center indicator. With the center true it was now a simple matter to test the three lips with the center indicator to discover which lip was not concentric. After stoning down the high lip, the holes were counterbored to .750. *—David T. Armstrong, New Jersey State Teachers College, Trenton.*



Easy-to-get Materials

BY *John N. Pantano*
INSTRUCTOR, SCHOOL NUMBER TWO, PATERSON, N. J.

ALL-OUT war with its necessary priority allocation of vital materials to the armed forces and industry brings to shop teachers an increasing problem in the matter of securing metals and other materials needed in school shops. The following substitute sources of supplies were developed over a long period in the depression years in a poor school district which could not afford to utilize the standard sources other schools utilized. Now they can be used again.

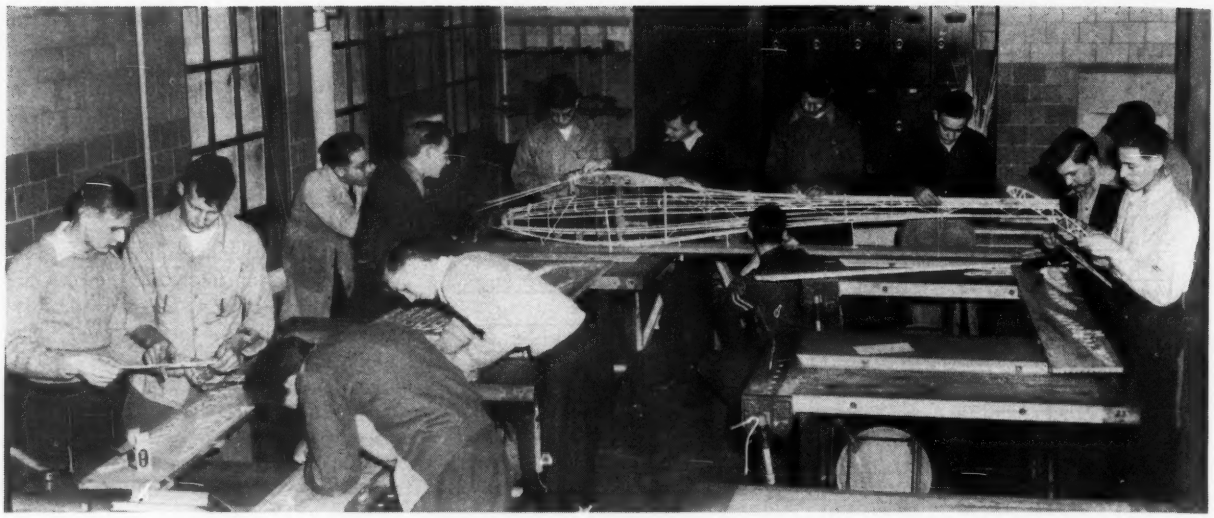
Every cellar and every attic in a school district is a potential storeroom of usable materials. Old aluminum pots and pans, tin cans, and an endless stream of worn-out pieces will be brought in if you can show what can be done with these odds and ends.

Old aluminum pieces can be a valuable source of metal for the making of small hammered ash trays of all shapes, candy dishes, napkin rings, novelty pins, and bracelets. After cutting off spouts, bottoms, and rims, a little work with a soft-faced mallet will result in fine sheets of aluminum.

This same program can be carried further to include other departments of special or general shops. For example, home mechanics has now become an important part of our general shop. The supply of material for teaching this phase of our work is inexhaustible. Boys are usually more than willing to bring in old faucets, sink traps, old electric sockets, usable portions of broken window panes, window shades and rollers, old electric irons and toasters. The teaching possibilities with this array of household materials is certainly challenging. It is as useful and serves the same purpose as if the material were new. In fact it is of greater value educationally because there is less hesitation about permitting freedom of examination, disassembly, and trial.

Set up a fine educational program which combines conservation of materials and correlation of music by making musical instruments. Many stringed instruments can be made with little more than cigar boxes, broom handles, and steel piano wire.

Tin cans have long been a good source of material. There are a number of books on this subject which should be looked over. Then there is always the junkyard for metal scraps.



Constructing and engineering a one-third scale model glider for practice purposes the first semester.

Austin Takes to the Air

BY *Guy O. Tollerud*

Minnesota has an unique new plan for the promotion of aviation education through school shops. This is a description of one school's experience with the plan as told by the former Director of the Manual Arts Department and War Production Training at Austin, Minnesota, who is now state director of the VTWPW program.

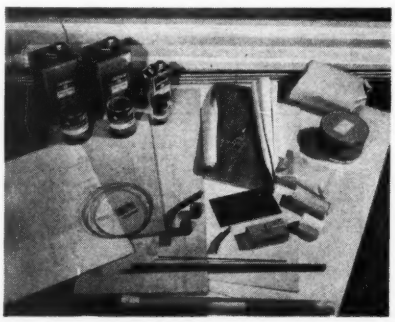
THE Austin, Minnesota, high school is offering a course in glider construction known as the Preparatory Aero-Mechanics Glider course. The Austin school, along with 12 other high schools of the state, is giving this course as a part of a state-wide plan originated by the Gliding, Soaring, and Aeronautical Education Division of the Minnesota Aeronautics Commission. It is sponsored through members of the Governor's Committee on Gliding. Members of this Committee are: Major M. N. Walsh, Chairman; Mr. George Selke, Secretary; and Mr. Leonard Olson, Committee member. This program is under the supervision of Mr. Ted Bellak, State Director of Gliding, Soaring, and Aeronautical Education, who is ex-officio member of the Governor's Committee. Staff members are: Mr. Glenn D. Argetsinger, assistant to Mr. Bellak and editor of the *Newsletter*, and Mr. Robert L. Heermance, Supervisor of Construction and Maintenance Department.

The course at Austin is given for seniors and is a full-year course of one hour per day, carrying one credit towards graduation. Nineteen seniors are enrolled in the course. It is taught by Willard A. Hardy, industrial arts instructor. S. T. Neveln is the superintendent of the Austin Schools.

The purpose of this course is to teach senior boys the fine skills and technical knowledges needed in glider and aircraft construction. Principles of glider flying and nomenclature pertaining to gliders and airplanes are taught as an integral part of the course. This training is given for the purpose of developing an interest in, and understanding of, aviation. The point is recognized that a good pilot will operate his plane or glider far better if he understands the construction details of his ship. The boys in the course are being prepared for work either in glider construction industries or for the armed forces.

The high school operates on a two-semester basis. The first semester's work was given over to the study of the various types of gliders, their parts and construction details. Three texts were used for this foundation study as follows: (1) *Aircraft Maintenance* by Brimm and Boggess; (2) *Flight without Power* by L. B. Barringer, and (3) Civil Aeronautics Authority *Airplane* manual. Since this is a shop course, only a limited amount of time was devoted to textbook study. The fundamental principles and technical information, however, were obtained through the use of texts, information sheets and job sheets prepared and furnished by the state; through classroom discussions, and teaching technics developed by the instructor.

Complete kit of materials supplied to each high school in the program by the state.



As soon as the fundamentals had been learned, shop work was started to develop the fine skills required in glider and aircraft construction. Various projects, such as rib construction, spar construction, jigs, fixtures, testing devices, etc., were made in the class. The instructor attempted to give each boy preliminary training in the making of various parts of a glider. As soon as a fair degree of efficiency was reached in this type of construction, the class undertook the making of a flying type glider one-third size. CAA specifications and standards were stressed in every detail. Only accepted standards of workmanship, materials, and parts were used.

The second semester's work will consist of the actual building of a tow-type pre-flight glider, full size. This type of glider was chosen by the state director of this program because it had three definite possibilities:

1. It would provide the training in the development of skills and techniques needed in glider construction.

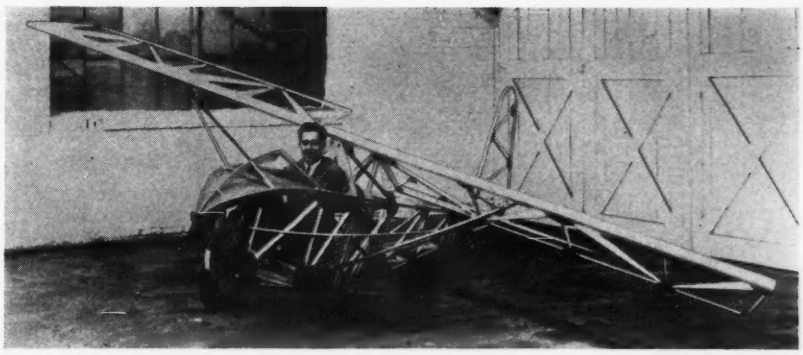
2. It would provide for various related studies on the part of the stu-

dents, as well as the instructor, without involving CAA certification.

3. This type of ship could be used by every school in teaching boys the manipulation and feel of the controls simulating actual flight of a real glider without leaving the ground. It would, therefore, provide for the initial fundamental training of glider piloting, without the hazards of leaving the ground involved in uncontrolled flight training.

This glider uses most of the principles and construction details of a flying-type glider. It is an all wood constructed ship and does not require the use of critical war materials. It is covered with fabric and doped as are regular flying gliders. It has all the appearances of the trim standard model.

The material for this ship is furnished the Austin school as well as all of the 13 participating schools, by the Gliding, Soaring and Aeronautical Education Program, which has been given a grant of funds for this purpose by the state. These trainer gliders will, therefore, be the property of the state and will be used for training purposes at a special training center which is being established. It is planned that pilot training be made available to all of the boys in these courses throughout the state who wish to take this training. In addition to these trainer models, flying type ships will be used as soon as a minimum number of boys have reached a point in training where they can fly actual ships.



Primary tow glider being built the second semester. This type of ship does not leave the ground but does give training in the manipulation of controls and the "feel" of gliding.

The boys enrolled in this course at Austin, as well as the instructor, have been very enthusiastic over this program since its inception. They have acquired a high standard of workmanship and have learned a great deal about aircraft construction. Related information, such as mathematics, geometry, terminology, physical principles, etc., has been mastered easily because of the application made during the building process. We feel that this is a splendid course and fits in well in the industrial arts curriculum. It is a step in providing shop instruction for high-school students in the aircraft industry which is now developing so rapidly because of the war effort. We highly recommend such courses and believe every school should develop similar programs.

[EDITOR'S NOTE: At the present time there are thirteen high schools in Minnesota participating in the state glider construction program as follows: Albert Lea, Appleton, Austin, Brainerd, Eveleth, Minneapolis, St. Cloud, St. Louis Park, Saint Paul, Virginia, Duluth, Winona, and Worthington.]

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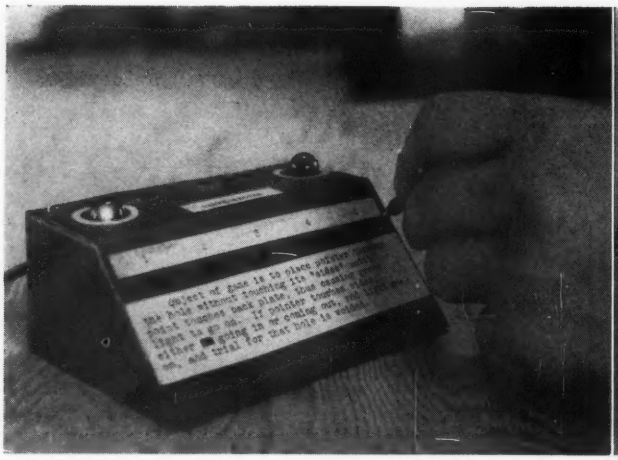
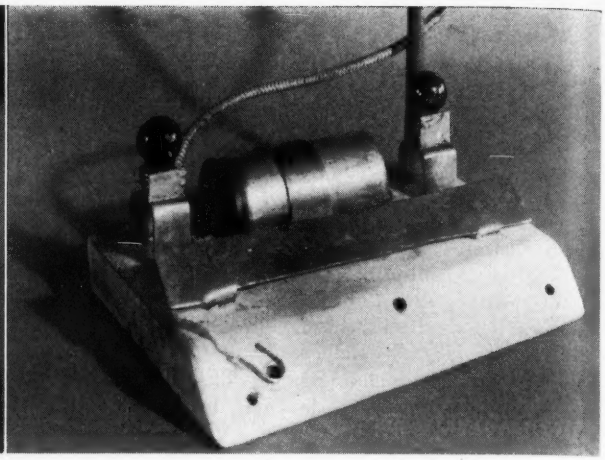




Nerve Tester

BY Byron M. Taylor

The "Nerve Tester" has a uniqueness and a game-of-skill element which make it appeal to shop students. In addition it offers opportunities in teaching electricity, woodworking, and sheetmetal working. The author teaches electricity at Woodrow Wilson Junior High School, San Diego, California.

"STEP this way, ladies and gentlemen, and test your nerves! Are your nerves as steady as they once were? Your money refunded if you can work the little machine all the way through." Thus chanted the attractive young lady at the charity bazaar. Needless to say, she was reaping a golden harvest for her pet charity, not only because she was a very becoming figure herself, but because there was a fascination for her audience as they watched people try the "nerve tester"—and then tried it themselves. Men and women, young and old, paid their fees and tried to outdo the little device—few, indeed, were the refunds the young lady had to make.

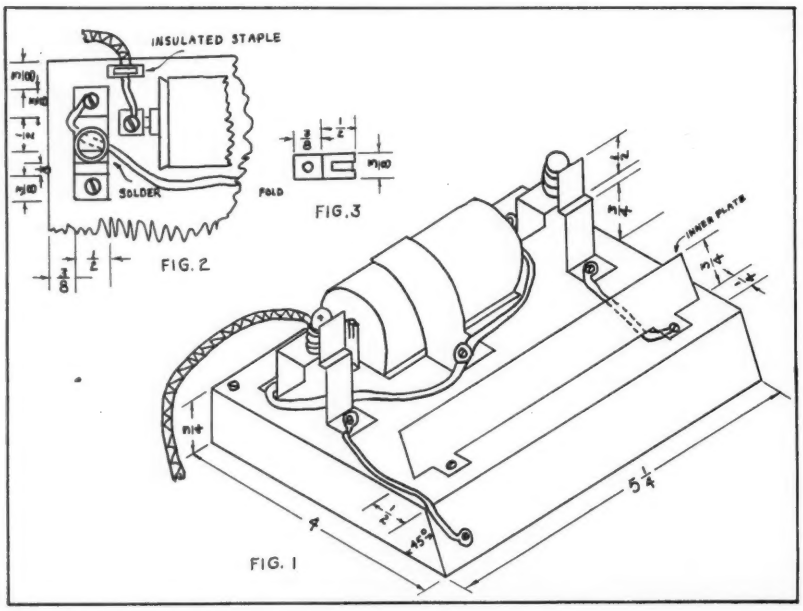
This electrical project has provided a very popular and amusing interlude at bridge parties; it has proved itself an instructive job in school shops, and it is an excellent gift for people of all ages. One college professor has used it as a valuable aid in testing nervous reactions and their changes over a period of time in his psychology classes.

Begin construction with the base by cutting a piece of ¾″ soft pine 4″ x 5¼″. Then plane one long side to an angle of 45 degrees (See Fig. 1). Next cut a depression as shown so that a regular size flashlight cell will rest about ¼″ below surface. Remove and discard pasteboard case from dry cell. Fasten dry cell to base with metal strip and two No. 3 x ⅜″ R.H. wood screws. Next, construct the sockets for the lamps —two 1.25-volt flashlight bulbs will be required. First cut two pieces of thin sheetmetal, copper, brass, or tin, ½″ x 1¾″ and bend as shown in Figs. 1 and 2. Now, wrap a piece of No. 18 bare copper wire in the thread depressions around the base of a lamp. This will require four complete turns. Carefully unscrew lamp from wound wire. Repeat this process, then solder wires to sheetmetal pieces just constructed and shown in Figs. 1, 2, and above. To make the bottoms of the lamp sockets, cut two pieces of sheetmetal ½″ x 1½″ and bend as shown in Figs. 1 and 2. Fasten the two socket pieces to tester base with wood screws as shown. With a piece of No. 18 copper wire, connect the two socket buttons and the metal strip surrounding the dry cell together.

To construct the inner contact plate, cut a piece of sheetmetal 1″ x 4¾″. Cut to shape (Fig. 1), fasten to base with two wood screws, and then bend plate up until it is at an angle of 45° from the base. From the screw holding the right-hand socket body, run a piece of copper wire to a screw holding the inner plate.

One lamp should be green and the other red. They may be colored by dipping in very thin lacquer or enamel. The green light goes in the right-hand socket. Next, make the positive contact for the dry cell. Fig. 3 shows a detail of the contact point. Fasten it to the base as shown in Fig. 2, being certain that it contacts the center post of the cell.

The contact pointer is made of a 6″ piece of ⅛″ brass or steel rod to one end of which is soldered about 2′ of lamp cord, or, better, a piece of extra flexible cord such as a lead from a head-



phone set. Over the rod, and soldered connection, is slipped a 6" piece of 1/8" I.D. fibre or rubber tubing. The other end of the cord is fastened around the screw holding the positive contact. To take the strain off the screw, the cord is fastened to the base with an insulated staple (Fig. 2).

The case and outer contact plate is made of three pieces of the sheet-metal. A layout of the top piece is shown in Fig. 5. The top piece is cut from a piece of sheetmetal 5¾" x 6⅞". The slot shown in the back is for the cord. The flap in back may be bent up to change the dry cell without removing case. Drill or punch holes as shown in Fig. 4. Bend top piece to shape and solder on end pieces. The outside of the case should be covered with lacquer or enamel of some color other than red or green. If "crackle" enamel is available, it will add greatly to the attractiveness of the tester. When enamel has dried, be sure to remove any that clings to the inner surfaces of the contact holes, otherwise electrical contact will be prevented.

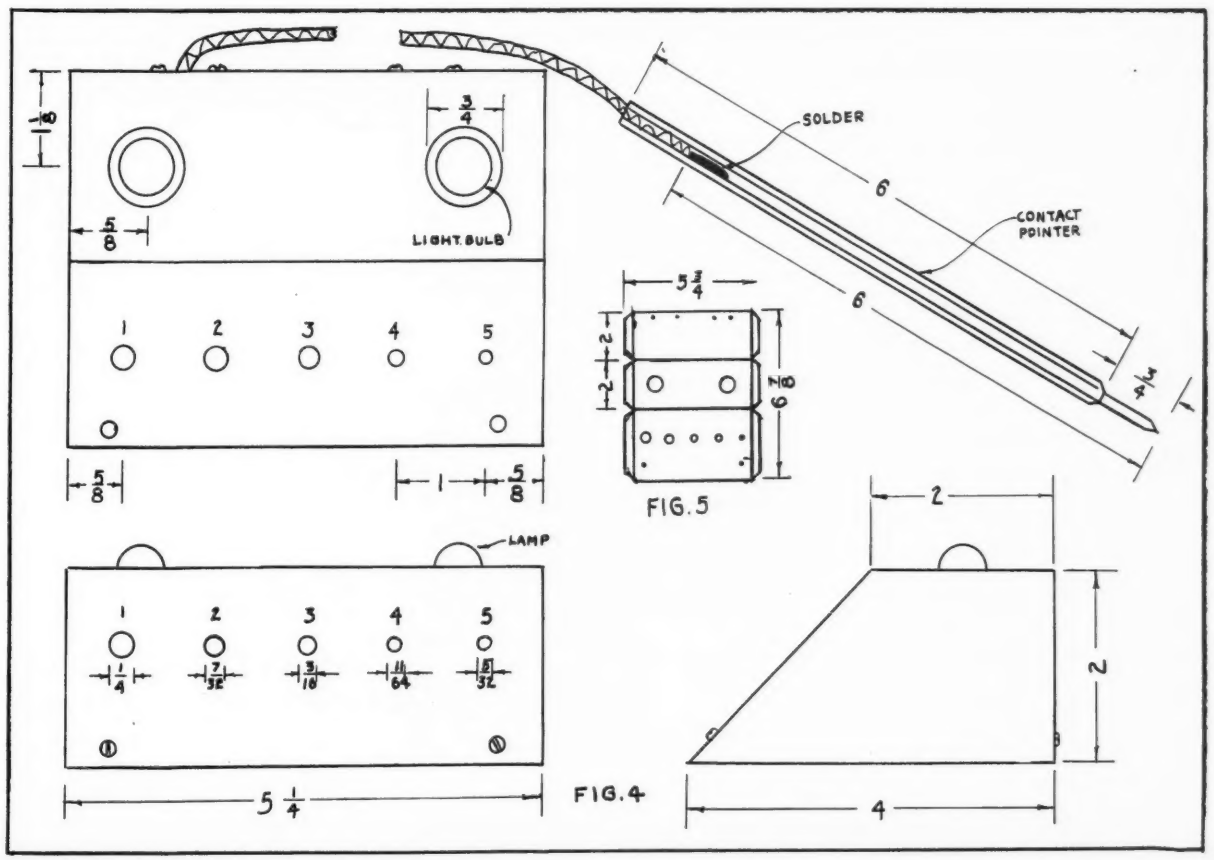
Run a piece of copper wire from the left-hand socket body screw to a point on the base opposite front and left screw hole in base. Make large eye in end of wire. Be sure this wire does not touch inner plate. Case may now be placed on base and securely fastened with No. 3 x 3/8" wood screws. If pointer is now placed against "sides" of holes, the red light should go on, and if pointer touches inner plate, the green light should go on.

There are many variations to operating the nerve tester, but there are a few rules basic to all of them. If the following is typed or printed and pasted on the front of the case, it will save many explanations. *Object of the game is to place pointer through a hole without touching its "sides" until point touches inner plate, thus causing green light to go on. If pointer touches sides, either going in or coming out, red light goes on and trial for that hole is voided.*

Some people may prefer to assign a value to each hole and take, say, five trials. One may prefer to start with No. 1 and proceed as far as possible up the line, keeping score. Another, being conservative, may make five attempts at No. 3 with consequent fairly high score. Still another, the "plunger" type, may concentrate on No. 4 or No. 5, thus playing for higher stakes. At a party or in a group, it may be agreed to award a "green" a certain amount, but if a "red" is produced then the person's score is reduced a like amount. This injects a note of caution into the proceedings. A very interesting personal record may be kept by an individual over a period of weeks or months by allowing oneself a definite number of trials, beginning with No. 1 and recording each time the hole reached as a limit. A person's vocation will of course influence his score—the most proficient the author has observed being a woman artist who does a great deal of miniature portrait painting and who consistently does the No. 5. A No. 5, by the way, is a very very rare occurrence but still just common enough to offer a strong incentive to an operator.

A SIMPLIFIED way of teaching students and trainees the reading of the micrometer is by the so-called "Dollar and Cents" method. The procedure is to have the student transfer the graduations on thimble and sleeve into dollars and cents. This then, would make the numbers from 0 to 10 inclusive on the sleeve represent a value of ten dollars. The individual numbers would represent dollars and the graduations between, quarters or 25 cents. The graduations on the thimble would represent a total of one quarter or 25 cents in units of one cent.

After having mastered the reading of the micrometer by this method the conversion into thousandths and one hundred thousandths becomes very simple.—*Charles F. Geatty, Flint,* in the *Michigan Vocational Outlook.*



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New books and materials on aviation are appearing regularly. In SCHOOL SHOP's monthly *Instructional Resources* department will be found reviews of these books.

This bibliography was compiled for the most part from lists provided by the publishers themselves, at SCHOOL SHOP's request. Inquiries may be addressed to SCHOOL SHOP or to the publishers, whose addresses are given at the end of the bibliography.

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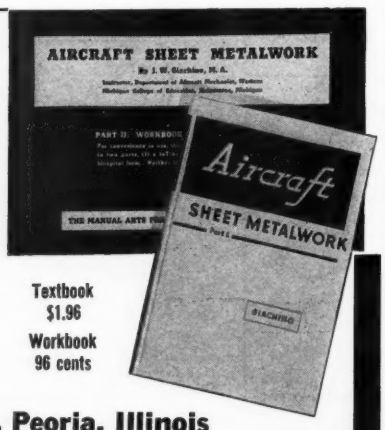

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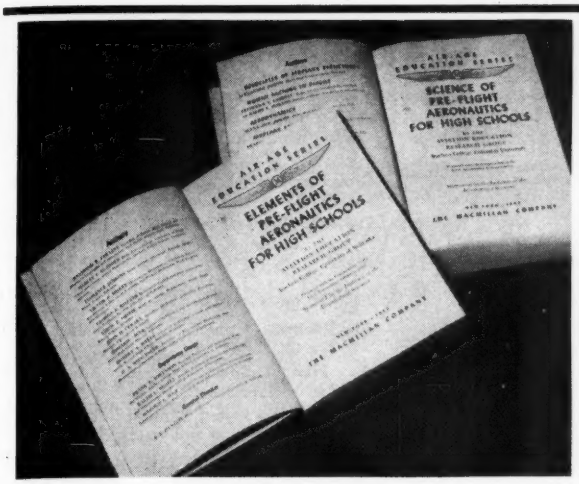
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Reading Aircraft Blueprints. Goff, Novak. Bloomington, Ill.: McKnight & McKnight. 1942. Pt. I, pp. 72; II, pp. 54; III, blueprints. $2.

Aircraft Electricity & Radio . . .

Aeronautic Radio. Eddy. New York: Ronald Press Co. 1939. Pp. 502. $4.50.

Aircraft Electrical and Ignition Systems. Manly. Chicago: Frederick J. Drake & Co. 1942. Pp. 280. $2.

Aircraft Electrical Systems. Jorch. New York: Ronald Press Co. 1943. Pp. 222. $3.

Aircraft Electricity. Clark, Corbitt. New York: Ronald Press Co. 1942. Pp. 350. $3.50.

Aircraft Radio & Electrical Equipment. Morgan. New York: Pitman Publishing Corp. 1941. Pp. 384. $4.50.

Aircraft Engines . . .

Aircraft and Power Plant Accessory Equipment. Richardson. New York: National Aeronautics Council. 1943. Pp. 128. $1.

Aircraft Engine Maintenance. Brimm, Boggess. New York: Pitman Publishing Corp. 1939. Pp. 479. $2.50.

Aircraft Engine Maintenance. Suddeth. New York: John Wiley & Sons. 1942. Pp. 274. $2.75.

Aircraft Engine Mechanics Kit-set. Detroit: Jam Handy Organization. 24 slidefilms. Each, $3.50.

Aircraft Power Plant Manual. Manly. Chicago: Frederick J. Drake & Co. 1942. Pp. 760. $4.

The Airplane and Its Engine. Chatfield, Taylor, Ober. New York: McGraw-Hill Book Co. 1940. Pp. 414. $3.

Aviation Engine: Disassembly and Inspection. New York: Brandon Films, Inc. 16 mm. sound or silent film. Rent or sale.

Aviation Engines. Vols. I, II, Eveleth, Fenn. Vol. III, Brimm. Scranton: International Textbook Co. 1938, 1940. I, pp. 192, $2.35. II, pp. 226, $2.40. III, pp. 222, $2.50.

Cyclone 14 Aircraft Engine from Drawing Board to Final Installation in Plane. Paterson, N.J.: Wright Aeronautics Corp. 16 mm. sound film. Free loan.

Flight—Aviation Engines. Kuns. Chicago: American Technical Society. 1941. Pp. 363. $3.25.

Principles of Aircraft Engines. Shields. New York: McGraw-Hill Book Co. 1942. Pp. 378. $1.88.

Aircraft Instruments . . .

Aircraft Instruments. Patton. New York: D. Van Nostrand Co. 1941. Pp. 220. $2.75.

Airplane Instruments. Brimm. Scranton: International Textbook Co. 1940. Pp. 253. $2.45.

Facts About Aircraft Instruments. Elmhurst, N.J.: Kollsman Instrument Div. 1941. Free pamphlet.

Flight and Engine Instruments. Detroit: Jam Handy Organization. 2 slidefilms. Each $3.50.

Flight Instruments. Hurt, Wolf. New York: National Aeronautics Council. 1943. Pp. 96. $1.

Modern Aircraft Instruments. Irvin. New York: McGraw-Hill Book Co. 1941. Pp. 506. $5.

Pilots' and Mechanics' Aircraft Instrument Manual. DeBaud. New York: Ronald Press Co. 1942. Pp. 490. $4.50.

Aircraft Maintenance . . .

Aircraft Maintenance. Brimm. New York: Pitman Publishing Corp. 1940. Pp. 512. $2.50.

Airplane Maintenance. Younger, Bonnalie, Ward. New York: McGraw-Hill Book Co. 1937. Pp. 353. $3.

Airplane Maintenance. Lesley. New York: John Wiley & Sons. 1940. Pp. 511. $2.75.

Flight—Construction and Maintenance. Wright, Dyer, Martin. Chicago: American Technical Society. 1941. Pp. 259. $2.50.

Aircraft Mechanics . . .

Aircraft and Engine Mechanics. Zweng. Bloomington, Ill.: McKnight & McKnight. $3.

Aircraft Mechanics Kit-set. Detroit: Jam Handy Organization. 43 slidefilms. Each, $3.50.

Aircraft Mechanic's Pocket Manual. Ashkouti. New York: Pitman Publishing Corp. 1942. Pp. 160. $1.50.

The Aviation Mechanic. Norcross, Quinn. New York: McGraw-Hill Book Co. 1941. Pp. 563. $3.

Ground Instructor. Zweng. Bloomington, Ill.: McKnight & McKnight. $3.

The Man Behind the Flight. Jordanoff. New York: Harper & Brothers. 1942. Pp. 276. $3.50.

Flight Instruction . . .

Air Piloting. Simmons. New York: Ronald Press Co. 1941. Pp. 758. $4.

Air Pilot Training. Shields. New York: McGraw-Hill Book Co. 1943. Pp. 656. $3.50.

The Complete Flying Manual. Hartney. New York: National Aeronautics Council. 1943. Pp. 123. $1.25.

Flight Instructor. Zweng. Bloomington, Ill.: McKnight & McKnight. $3.

Manual for Aviation Cadets. Hoyt. New York: McGraw-Hill Book Co. 1943. (in press).

Methods of Flight. New York: Bray Pictures Corp. 16 mm. sound film. Rent, sale.

Pilot Training Kit-set. Detroit: Jam Handy Organization. 24 slide-films. $65.

Radio and Instrument Flying. Zweng. Bloomington, Ill.: McKnight & McKnight. $4.

The Student Pilot's Training Primer. Knerr. New York: D. Van Nostrand Co. 1941. Pp. 172. $1.75.

General Aviation Books . . .

Aviation in the Public Schools. Hambrook. Washington: Supt. of Documents. Pp. 78. $0.15.

Bibliography of Aviation Education Materials. Cartwright, Fisk, Lant, Meares, Stover. New York: The Macmillan Co. 1942. Pp. 139. $0.88.

Bomber. Carl Sandburg. New York: Brandon Films, Inc. 16 mm. sound film. Loan.

Flying Fleets. Johnston, New York: Silver Burdett Co. 1943. Pp. 200. $2.20.

Flying Squadrons. New York: Silver Burdett Co. 1943. Pp. 246. $2.56.

(Continued on page 21)

The Publishers . . .

Here are the main-office addresses of the publishers and film producers whose offerings in aviation are listed in the bibliography. They will be pleased to answer your inquiries about their publications and films . . . *write them!*

American Technical Society
Drexel Ave. at 58th
Chicago, Ill.

Boy Scouts of America
2 Park Ave.
New York, N. Y.

Brandon Films, Inc.
1600 Broadway
New York, N. Y.

Bray Pictures Corp.
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New York, N. Y.

Thomas Y. Crowell
432 Fourth Ave.
New York, N. Y.

Frederick J. Drake & Co.
600 W. Van Buren St.
Chicago, Ill.

Eastman Kodak Co.
Teaching Films Div.
Rochester, N. Y.

Ginn & Company
Statler Bldg.
Boston, Mass.

Paul K. Guillow
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Wakefield, Mass.

Walter O. Gutlohn, Inc.
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New York, N. Y.

Jam Handy Organization
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Detroit, Mich.

Harcourt, Brace & Co.
383 Madison Ave.
New York, N. Y.

Harper & Brothers
49 E. 33rd St.
New York, N. Y.

D. C. Heath & Co.
285 Columbus Ave.
Boston, Mass.

Norman W. Henley Publishing Co.
17 W. 45th St.
New York, N. Y.

Henry Holt & Co.
257 Fourth Ave.
New York, N. Y.

International Textbook Company
Scranton, Pa.

Jay Publishing Corp.
551 Fifth Ave.
New York, N. Y.

J. B. Lippincott Co.
227 S. Sixth St.
Philadelphia, Pa.

J. & J. Love Educational Films
Chatsworth, Calif.

The Macmillan Co.
60 Fifth Ave.
New York, N. Y.

The Manual Arts Press
Peoria, Illinois

McGraw-Hill Book Co.
330 W. 42nd St.
New York, N. Y.

McKnight & McKnight
Bloomington, Ill.

National Aeronautics Council, Inc.
37 W. 47th St.
New York, N. Y.

Noble & Noble, Inc.
100 Fifth Ave.
New York, N. Y.

Pitman Publishing Corp.
2 W. 45th St.
New York, N. Y.

Prentice-Hall, Inc.
70 Fifth Ave.
New York, N. Y.

The Ronald Press Co.
15 E. 26th St.
New York, N. Y.

Silver Burdett Co.
45 E. 17th St.
New York, N. Y.

D. Van Nostrand Co.
250 Fourth Ave.
New York, N. Y.

John Wiley & Sons, Inc.
440 Fourth Ave.
New York, N. Y.

John C. Winston Co.
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World Book Co.
Yonkers-on-Hudson
New York

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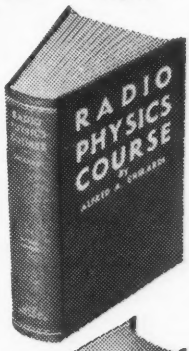

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Console Set

BY *E. LeRoy Longley*

THE idea for this console set germinated from a picture of a leaf. While browsing through the interesting book, *Art Forms in Nature* by Karl Blossfeldt (published by E. Weyhe, 794 Lexington Ave., New York City), the leaf shown in the accompanying illustration demanded attention. It was defined as follows: "Macleya cordata. Celandine tree, belonging to the family of the papaveraceae. Young shoot enlarged five times."

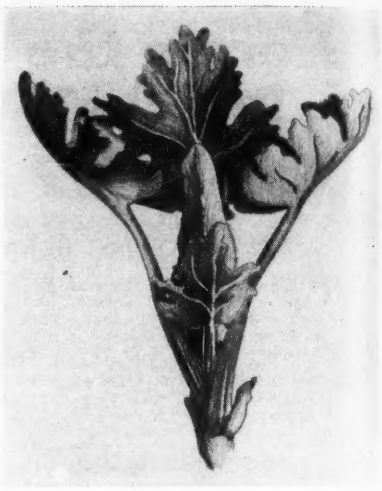
The general shape of the young shoot suggested a candle holder. This was designed with the stems of the leaves stylized to make suitable legs for the holder while the inner bud was transformed into a tube to hold the candle. To complete the set, a bowl was planned using a similar leaf as the motif with round copper rod forged and formed into shape for the legs and base. The leaves and stems (or legs) in both projects were made of copper. Bowl and candle holder tube were of brass. The copper rod was of ¼" diameter and the leaf material was 20 ounce. The tube needs to have an inside diameter of at least ¾". The bowl is made of 18-gauge brass.

Figure 3 shows the arrangement of the legs (or stems) on the candle-holder tube. Figure 5 shows the method of fastening.

Figure 4 shows the arrangement of the stems (or legs) for the base of the bowl, while figure 5 shows the form and shape of the stems (or legs) of the candle holder. Figure 6 shows the form and shape of the bowl base as well as the curvature of the bowl.

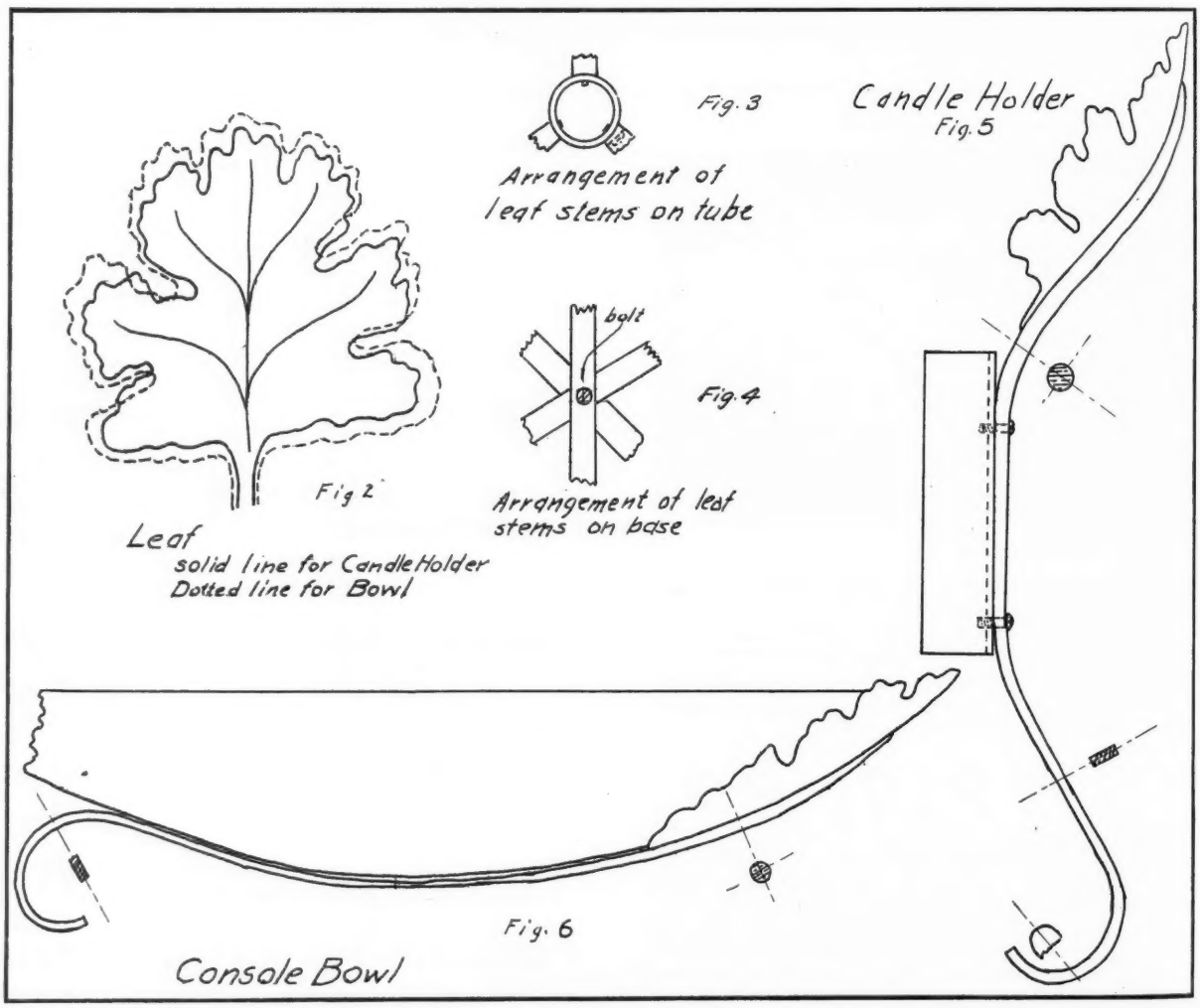
Following are brief instructions for making the parts. These instructions are given in the form advocated by the U. S. Office of Education for training men on a new job.

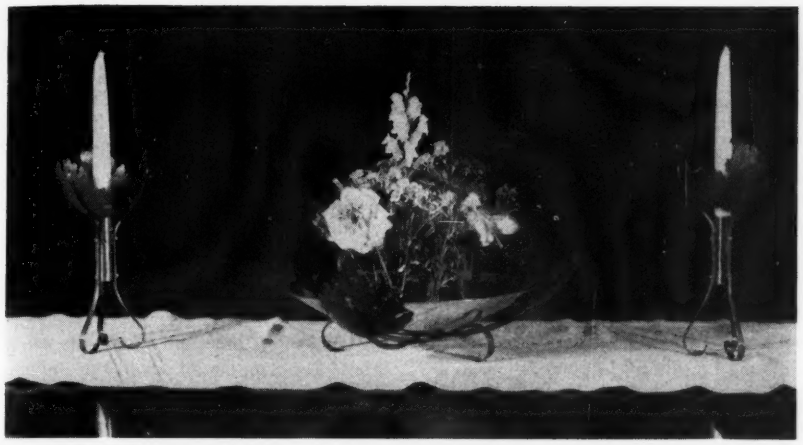
This project demonstrates the utilization of forms from nature for the inspiration of project patterns. The author teaches metalworking in the Baltimore, Maryland, schools.



Candle-Holder

Leaf (make three).—(1) Transfer pattern to metal (16- or 20-ounce copper). (2) Saw (jeweler's saw). (3) File





edges with needle files. (4) Vein, using scratch awl, engraving tool, or motor tool. (5) Raise, using block and sheet-metal worker's raising hammer.

Stem.—(1) Cut three pieces from stock ¼" in diameter and 10½" long. (2) Forge and file to shape, annealing if necessary during forging process. See figure 5 for shape. (3) Form with mallet and stake as in figure 5. (4) Drill hole for screw to fasten stem to candle-holder tube.

Candle-holder tube.—(1) Cut ¾" I.D. brass tubing to 3" long. (2) Drill and tap for screws for attaching stems or legs, using about a No. 10 R. H.

(Continued on page 21)

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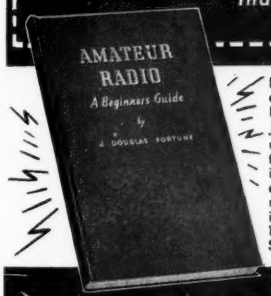

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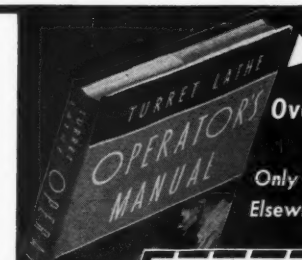

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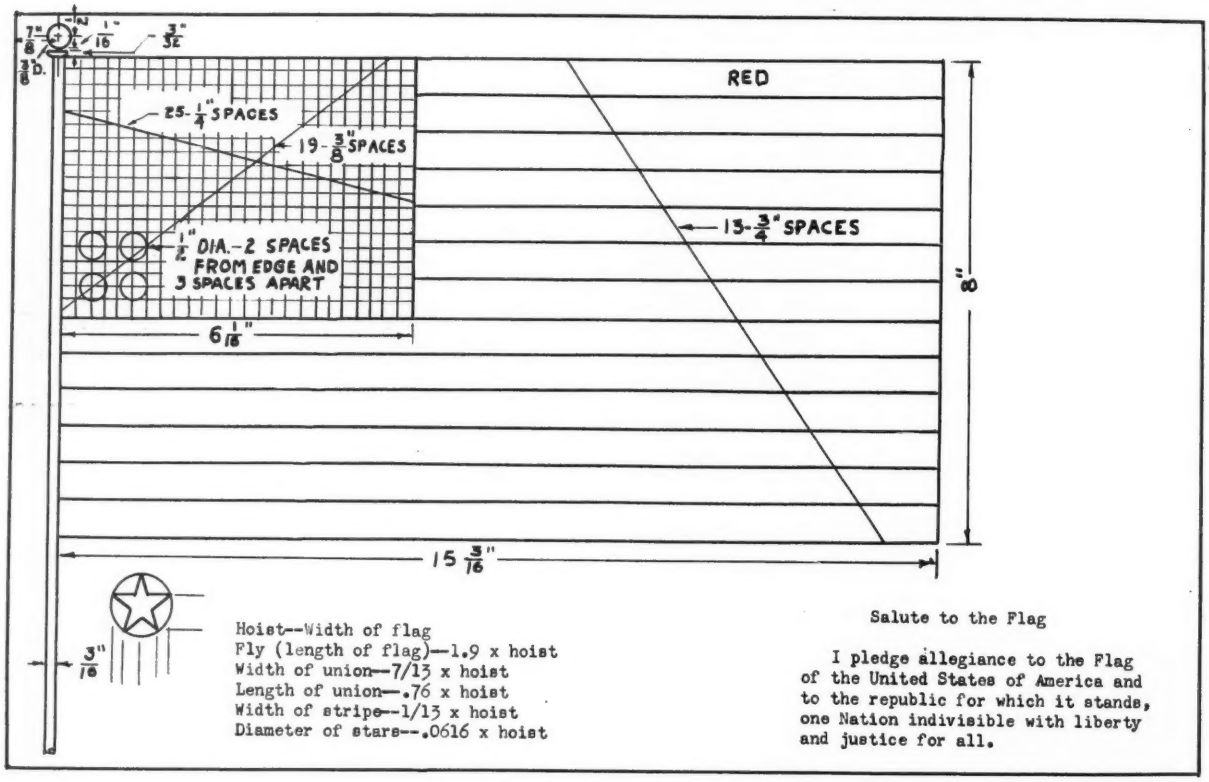
Patriotic Problem in Drawing

BY *Howard W. Boekeloo*

This drawing problem is based on the Flag Code as drawn up by the American Legion and is particularly timely now. The author teaches drawing in the Kalamazoo, Michigan, public schools.

TO make an effective drawing, white paper should be used and the flag should be colored with poster paints. Use ultramarine blue for the field and light red for the stripes. As paint will wrinkle the paper, shrink the paper on the board before making the drawing. This may be done as follows: Wet the paper on both sides and then run a ¾" strip of glue, good mucilage, or heavy paste all around the edge. Stick tightly to the drawing board and let dry. When dry it will be as tight as a drumhead and will not shrink or wrinkle when paint is applied. Ink the staff but finish the remainder with poster paint. The most difficult part of the job, painting around the stars, will probably be most easily done by outlining with a small brush and then filling in between. The stripes will be best painted by using strips of masking tape to protect the alternate white stripes.

Flag proportions and the salute offer a lettering problem.


RED
25-1/4" SPACES
19-3/8" SPACES
13-3/4" SPACES
1/2" DIA.-2 SPACES FROM EDGE AND 3 SPACES APART
6 1/16"
15 3/16"
Hoist--Width of flag
Fly (length of flag)—1.9 x hoist
Width of union—7/13 x hoist
Length of union—.76 x hoist
Width of stripe--1/13 x hoist
Diameter of stars--.0616 x hoist
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news

WHAT'S DOING IN THE FIELD OF INDUSTRIAL EDUCATION

Movie Projector Suggestions . . .

The U. S. Office of Education has issued a number of suggestions regarding the acquisition of motion-picture projectors for schools.

In purchasing a new projector, the school is advised to write manufacturers asking if projectors are available if the proper preference rating is furnished. When a manufacturer is found who can furnish a projector, the school should then prepare a request for rating on WPB form PD-1A.

The application must state clearly that the request is for a 16mm. sound machine to be used strictly for war-training purposes. This form should then be filed with the Consumers' Durable Goods Branch of the War Production Board, Washington.

For parts for repair and maintenance, the school first should inquire from the manufacturer whether the part sought is available, and, if so, whether a preference rating is required. If no rating is needed, the part may be ordered as usual. To obtain a rating, the procedure outlined for new projectors is to be followed, with, again, the statement that the parts are needed for war-training purposes.

If parts cannot be obtained, the Office of Education suggests repeated attempts to get them, since the picture is constantly changing with regard to parts and dealers may be only temporarily out of stock. There are no restrictions on the sale of projector lamps.

Model Aircraft Plans Delayed . . .

A delay is reported in the "E" series of model aircraft for the Navy plane-model program. A change in the design of a British plane in the "E" group is reported as one reason for the delay.

More Men to War Jobs . . .

Shop teachers will share in the training of men whose present jobs have been placed on the "nondeferrable" list by the War Manpower Commission. These men will be given the opportunity to find essential war jobs before being inducted into the Armed Forces.

Indiana Association Meets . . .

May 6, 7, and 8, will see the Indiana Industrial Education Association meeting at Indianapolis. The first day's meetings will be given over to the War Production Training Division of Indiana, under the supervision of H. G. McComb, State Director of the Division. Speakers at the Friday and Saturday meetings will be W. W. Charters, Director of the Training Division, WMC; Dr. W. V. Nestrick, Department of Education, Queens College, New York; and other educational leaders.

Priority Procedure Revised . . .

On February 27 it was announced that WPB form PD-1A, application for preference rating, had been revised. The announcement also stated that beginning April 15, PD-1A requests for ratings would be processed by WPB regional offices for amounts up to $500.

It is anticipated that processing time for these applications will thus be reduced from three or four weeks to three or four days.

WMC Offers Booklets . . .

Two booklets have been prepared for free distribution by the Apprentice-Training Service of the War Manpower Commission. These booklets, *Apprentice Training for America's Youth* and *The National Apprenticeship Program*, describe the work of the Service and information about it, including lists of its field offices.

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3 Check your carbide tools that MUST be "specials." Although the tool is special, the blank can often be *standard*. Keep a small master stock of those *standards;* braze them on your tools or cutters the same day the need arises. No "delivery" delays.

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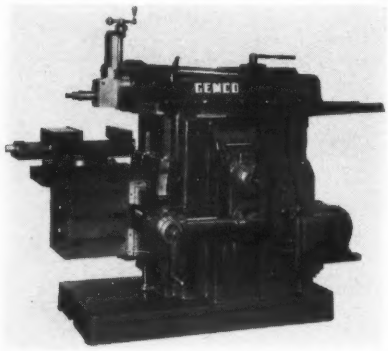
The ink is said to be free flowing and will not cake, no matter how long it is kept in stock. Black and white are thoroughly opaque, and all colors are waterproof and sunfast.

For a free sample bottle, instructors are asked to write on school stationery either to SCHOOL SHOP or to the Louis Melind Co., Dept. SS, 362 W. Chicago Ave., Chicago, Ill.



GEMCO Shaper Offers Many Features

Of particular interest to school machine shops is the Plain Type GEMCO shaper made by General Engineering and Mfg. Co., St. Louis. This shaper, made in 16" and 20" stroke models, has 16 new design improvements.

Most notable feature is the "Lubrigard" safety feature which prevents failures due to lubricating deficiency. This feature allows the student operator to concentrate his entire attention on operating the machine.

Descriptive literature on the GEMCO Shapers may be had by addressing SCHOOL SHOP or General Engineering and Mfg. Co., Dept. SS, St. Louis, Mo.

New Plomb Book: 'These Are Your Weapons'

These Are Your Weapons, a book designed to increase war production in Plomb Tool Company plants, is offered to instructors by the Plomb Company.

Written and illustrated by members of the Plomb Tool Co. staff, the book shows how more efficient production is obtained by the use of operating rhythm, drop delivery, proper layout of work, balanced motion, etc.

In offering the book to shop teachers, the company feels that it is of value in expressing simply the principles of time and motion study as applied to industry for which teachers are training workers.

Copies may be had without charge by writing SCHOOL SHOP or Plomb Tool Co., Dept. SS, 2109 Santa Fe Ave., Los Angeles, Calif.

Stanley Works Receives Army-Navy 'E'

The third Army-Navy "E" to be awarded to the Stanley Works was presented to the Stanley Tools and Stanley Electric Tools Divisions on March 17. Participating in the ceremony were the mayor of New Britain, Conn., where the plants are located, the governor of Connecticut, and officials of the company, the Army, and the Navy.

Previous Stanley "E" awards were to the Stanley Works, parent organization, on January 20 and to the American Tube and Stamping Plant Division on March 18.

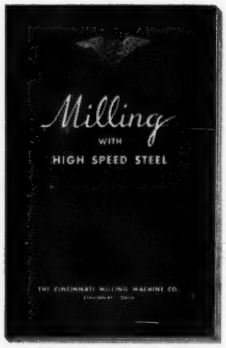
Booklet Describes 'Di-Acro' System of Die-less Duplicating

The "Di-Acro" system of metal duplicating without dies is described in a recent book offered by the manufacturer of Di-Acro equipment.

The book shows how the Di-Acro precision shear, brake, and bender enable the production of identical metal parts to tolerances of a thousandth of an inch. The machines are instantly adaptable to all sorts of work.

Instructors, it is said, will find the machines of value in teaching various sheetmetal courses particularly related to industrial metal fabrication.

Copies of the booklet may be had without charge by writing SCHOOL SHOP or O'Neil-Irwin Manufacturing Co., Dept. SS, Minneapolis, Minn.



'Milling with High Speed Steel' Booklet Offered to Teachers

A 24-page book, *Milling with High Speed Steel*, is offered to machine-shop teachers by Cincinnati Milling Machine Co.

Through text, drawings, photographs, and tables, the booklet shows the technics of milling high-speed steel. Subjects covered are cutter design, mounting of cutters, mounting of work, feeds and speeds, action of cutting fluids, care of cutters, etc.

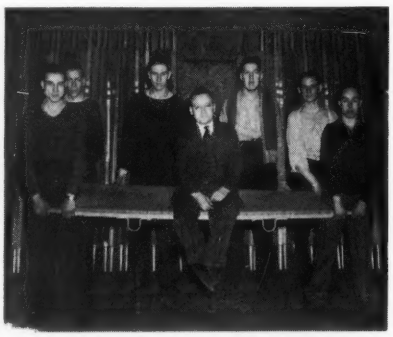
Copies may be had without charge by writing SCHOOL SHOP or Cincinnati Milling Machine Co., Dept. SS, Cincinnati, Ohio.

IN THE Morning Mail...

Brief comments about **SCHOOL SHOP** *and the field it serves are invited. Address the Editor,* **SCHOOL SHOP**, *Ann Arbor, Michigan.*

Gentlemen:

I have intended for some time to thank you for SCHOOL SHOP. It has a new fresh viewpoint which I like. I especially like such departments as *Washington Letter*, *What Do You Think*, and *Instructional Resources*. . .



Probably stories about the manufacture of stretchers are old stuff to you by now, but we enjoyed making 25 government-specification stretchers for East Liverpool Civilian Defense and had a few production problems to solve.

Poles for the stretchers are 7'6" long and have handles turned on each end. We bolted two three-foot lathes together to do this and had two boys turning at a time, one at each end. Of course the speed had to be very low because such long pieces would whip and jump out at higher speeds. For safety, we clamped two long vertical pieces to the front of the lathes so that a piece would not hit the operators if it jumped out. An assembly line was organized to put them together.

Projects like this and the airplane models not only help the war effort but they vitalize industrial arts work. Boys enjoy the work, they will put in all the overtime you will allow, and there is an incentive for fine accurate craftsmanship.

WALTER F. KREBS,
Industrial Arts Supervisor,
East Liverpool, O., High School

Gentlemen:

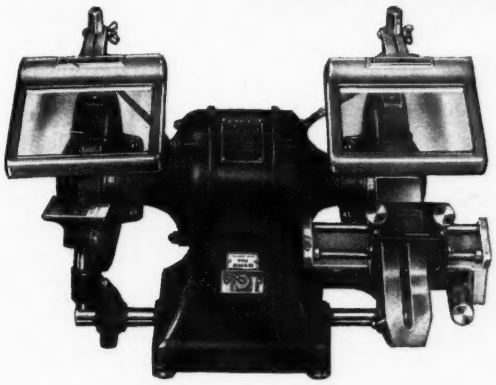
I do not know how it came to pass that I am receiving each month a copy of SCHOOL SHOP but whatever the circumstances which led up to it, they were most fortunate because my shop instructors and myself look forward each month with a great deal of anticipation to receiving it.

The articles are up to the minute and well written.

It is a fine magazine and I hope it lives to a ripe old age.

G. H. RUSSELL,
Director, War Production Training,
Central High School,
Fort Wayne, Ind.

RIGHT GRINDING EQUIPMENT



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STANLEY *Electric* TOOLS

EDUCATIONAL DEPARTMENT, STANLEY ELECTRIC TOOL DIVISION
THE STANLEY WORKS, NEW BRITAIN, CONN.

Instructional Resources

(Continued from page 14)

Horizons Unlimited. Johnston. New York: Silver Burdett Co. 1943. Pp. 354. $2.76.

Parts of a Plane. Washington: Air Youth Div., National Aeronautics Association. 1943. Chart. $0.10.

Teachers Junior Aviation Kit. Lock Haven, Pa.: Piper Aircraft Corp. $1.

Your Wings. Jordanoff. Boston: Ginn & Co. 1942. Pp. 294. $3.

Youth Takes to Wings. New York: Bray Pictures Corp. 16 mm. sound film. Rent, sale.

Gliding & Gliders . . .

Flight Without Power. Barringer. New York: Pitman Publishing Corp. 1942. Pp. 275. $2.50.

Sailplane. Chatsworth, Calif.: J. & J. Love Educational Films. 1941. 16 mm. sound and color film. $3, rent.

Youth Must Fly. McDonald. New York: Harper & Brothers. 1942. Pp. 253. $2.50.

Model Building . . .

Airplane Models and Aviation. Brown. Boston: D. C. Heath & Co. 1942. Pp. 43, paper. $0.48.

Elements of Model Airplane Radio Control. New York: Jay Publishing Corp. 1941. $0.50.

Flying Models: How to Build and Fly Them. Guillow. Wakefield, Mass.: Paul K. Guillow. 1942. $0.35.

How to Build Scale Models for Defense. Davidson. New York: X-acto-Crescent Products Co. Free.

Model Aircraft Handbook. Winter. New York: Thomas Y. Crowell. 1942. Pp. 292. $2.

Model Airplane Design and Theory of Flight. New York: Jay Publishing Corp. Pp. 528. $3.75.

Tom's Book of Flying Models. Guillow. Wakefield, Mass.: Paul K. Guillow. 1941. Pp. 32. $0.15.

Navigation . . .

Air Navigation. Zim. New York: Harcourt, Brace & Co. 1943. Pp. 324. $3.

Air Navigation. Hamilton. New York: Ronald Press Co. 1943. Pp. 175. $2.

Elementary Avigation. Moore. Boston: D. C. Heath & Co. 1943. Pp. 229. $1.60.

Navigation of Aircraft. Ramsey. New York: Ronald Press Co. 1941. Pp. 230. $4.50.

Practical Essentials of Pre-Training Navigation. Skilling, Richardson. New York: Henry Holt & Co. 1942. Pp. 113. $0.75.

Preflight Training . . .

A B C of Aviation. Page. New York: Norman W. Henley Publishing Co. 1942. Pp. 598. $2.50.

The American Student Flyer. Hamburg, Tweeney. New York: Pitman Publishing Corp. 1942. Pp. 700. $1.50.

Before You Fly. Robinson, Middleton, Rawlins, Phillips. New York: Henry Holt & Co. 1942. Pp. 640. $2.

Elements of Pre-Flight Aeronautics for High School. New York: The Macmillan Co. 1942. Pp. 521. $0.96.

Junior Aviation Science. Grimm. New York: Noble & Noble, Inc. 1942. $0.90.

One-Year Course Outline in Preflight Aeronautics. Washington: Civil Aeronautics Authority. 1942. Free.

Science of Pre-Flight Aeronautics for High School. New York: The Macmillan Co. 1942. Pp. 791. $1.32.

Console Set

(Continued from page 17)

screw. (3) Polish with buffer or steel wool. (4) Lacquer.

Assembling legs.—(1) Sweat solder leaves to stems. (2) Clean thoroughly with No. 00 steel wool. (3) Color using hot liver of sulphur solution. (4) Wax with ordinary paste wax, applying while job is still warm from coloring solution but dry. Rub wax lightly with soft cloth to secure high finish.

Final assembly.—(1) Fasten stems (legs) to tubes with round-head brass screws, size for which holes in tube were drilled and tapped.

Bowl and Base

Base.—Follow same procedure as in making leaves for candle holder (make three) and as in making stems, forming as shown in figure 6.

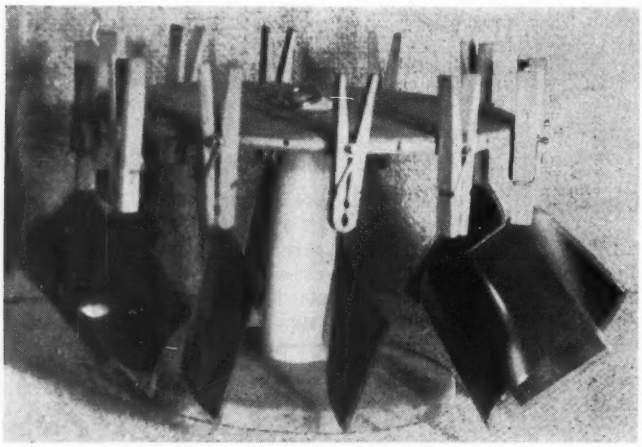
Assembly.—(1) Drill hole at point where stems will join well. (2) Fasten with round-head brass bolt and nut as shown in figure 4.

Bowl.—(1) Cut circular disc of 13" diameter from 18- or 20-gauge brass. (2) Raise using block and sheetmetal worker's raising hammer as in figure 6. (3) Smooth on round-top stake using mallet. (4) Polish with tripoli and rouge on buffer. (5) Lacquer.

Drying Rack for Negatives

BY *Homer C. Rose*

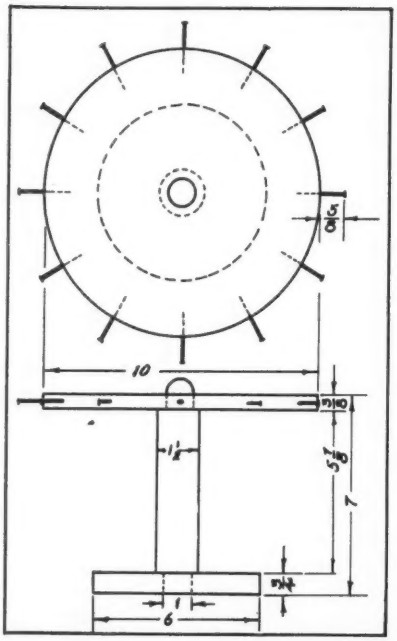
This is a simple woodworking project which has utilitarian value for the amateur photographers among students. Homer C. Rose formerly taught at Southern Illinois Normal University but now is a teacher trainer at the Armored Force Training School, Fort Knox, Kentucky.



TESTED INSTRUCTIONAL PROJECT

THIS compact circular drying rack is an aid to the amateur photographer. It can be moved from place to place; it holds the negatives a certain distance apart; it facilitates early inspection of the negatives after development, as each clamp and negative may be removed.

The rack is constructed of three pieces of wood and a dozen common spring clothespins.



Construction

Base: Cut a disk of ¾" soft wood to 6" diameter and bore a 1" hole in the center.

Column: Turn a 1½" x 1½" x 7½" piece of soft wood to dimensions shown in the drawing. For negatives over 3½" in length, the column may be made longer.

Top: Cut a disk of ⅜" plywood to 10" diameter, and bore a 1" hole in the center. Divide the outer edge of the disk into 12 equal spaces to mark location for nails. Carefully drill 1/16" holes to facilitate driving the nails straight. Sand all parts. Drive 6-penny nails or brads into the holes. The heads of these nails should be small enough to allow the spring clothespins to slide over them. They should be filed or ground down if necessary.

An eye-screw should be located at center top of the column as a handle. It also provides a means for hanging the rack in a warm place for drying negatives. The rack may be painted or varnished but the clothespins should be left unfinished.

Strictly Personal...

ABOUT YOUR FELLOW TEACHERS

LT. COL. VERNE C. FRYKLUND, formerly with the Armored Force School, Fort Knox, Ky., has been transferred to the Services of Supply, Washington, D. C., where he is working on pre-induction materials. . . . M. NORCROSS STRATTON has been made Director of the Division of Vocational Education of the Massachusetts Department of Education. He was formerly assistant director under R. O. SMALL, who has retired. . . . GEORGE DEAN has left the Michigan Board of Control for Vocational Education, where he supervised apprentice training, to go with the Michigan State Department of Labor. . . . GUY O. TOLLERUD now is State Supervisor of War Production Training in the Minnesota State Department of Education. He was formerly Supervisor of the Southern Minnesota area, coming to that position from Austin, Minn., where he headed the industrial arts department for 15 years. . . . URWIN ROUNTREE, Chief of Industrial Education, Pennsylvania State Department of Public Instruction, has been commissioned Lieutenant Commander in the Navy, to have charge of vocational training in several of the Navy Yards in the Washington area. . . . DEYO B. FOX has returned to Jackson, Mich., as Director of Vocational Education. He has been serving with the Michigan State Board of Control for Vocational Education as Supervisor of War Production Worker Training. . . . FERDY J. TAGLE has been made acting principal of McKee Vocational High School, St. George, Staten Island, N. Y. He taught previously at New York School of Printing.

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There are many opportunities for advancement this year. For nearly twenty years we have been filling educational positions throughout the East and South, specializing in Industrial Arts and Vocational subjects. Write, telling us about yourself.

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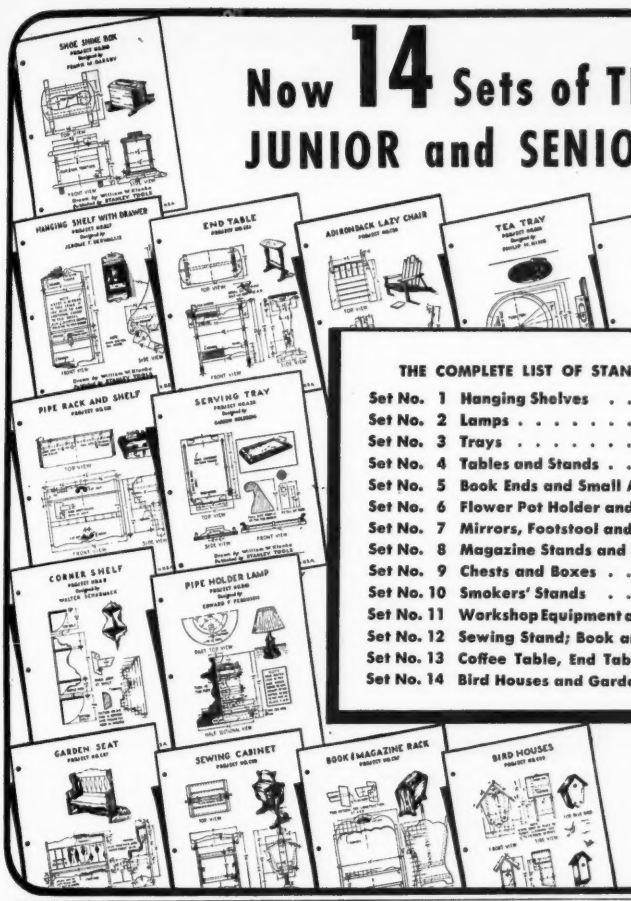

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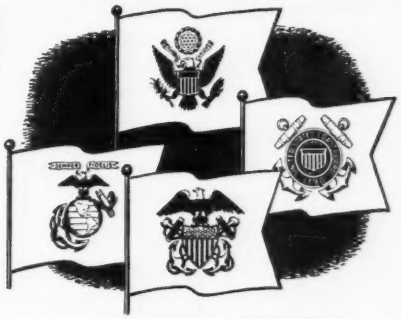

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from WASHINGTON by WILLIAM PACA

WILL American shop teachers soon be called to all parts of the world—Latin America, China, India, Near East—to help direct vocational education programs? This question is prompted by a development which needs the introduction below:

Nation after nation is realizing that it will be assured of a future only if its people can (1) read and write and (2) work with tools.

We have made some progress in teaching people of all countries to read and write. We have hardly begun the gigantic task of training people to work with tools and to handle complicated machinery and apparatus. In fact, among the populous nations, only the United States, Germany, Great Britain, and most miraculously of all, Soviet Russia, have made any progress in this field. A billion and a quarter of the world's population is still untouched by the great vocational and industrial training movements. But these people are slowly beginning their march toward vocational literacy.

Latest evidence is the interest of South American countries in our vocational education systems. During the last several months, Brazil, Mexico, Peru, and Haiti have sent representatives to look over our vocational training methods, to request samples of teaching materials and—to recruit vocational education instructors, primarily to train native shop teachers.

Five American vocational teachers have already left the United States for Brazil, with three-year contracts in their pockets. At least 30 other top-notch vocational teachers will be recruited this summer for Latin America. The Office of the Coordinator of Inter-American Affairs and the U. S. Office of Education are working on this project.

● Among the first jobs facing the Bureau of Training, War Manpower Commission, is to find ways and means to train more transportation workers. That is no easy task when you remember two facts:

First, "transportation" includes at least seven different branches—railroads, buses, trucks, intra-city vehicles (taxis, and streetcars), pipelines, airplanes, and water transportation.

Second, most of these industries, especially the railroads, have been training their own men for generations. Vocational schools and training agencies, hence, have no backlog of experience in training transportation workers. That doesn't mean that vocational schools will not be asked to assume some of the burden of training. They will be. The War Manpower Commission has already approved a list of eight transportation jobs for which training may be given by public vocational schools. More such occupations will follow.

Transportation is one of the real keys to victory. Yet, transportation facilities are creaking under the loads placed upon them by war demands. What the industry needs above all are workers—trained people to keep wheels turning and propellors churning.

● "Please, sir, will you fill in my *Educational Experience Summary* card?"

This is a question shop teachers will hear very frequently within the next few months. And how they fill in that card may affect the welfare of the pupil for life.

The *Educational Experience Summary* is a new educational document, now being rushed off the government printing presses by the millions. The Army is primarily interested in it now, for use in selecting high-school pupils for the Army specialized college programs. But within the next few months the *Educational Experience Summary* should be used widely by schools, employment services, selective service boards, and employers. The War Manpower Commission has approved it, as has the Farm Production Administration, which is in charge of recruiting and training farm workers.

At first glance, the *Educational Experience Summary* may be taken merely as a card summarizing officially an individual pupil's secondary school education and experience. It is a convenient digest for the pupil to carry with him, and to present to any agency or employer.

As teachers and employers become skillful in using this record, the *Educational Experience Summary* will assume wider importance. One official calls it "the blueprint of a life." The pupil who knows that he will be judged by the experience and training recorded in the card will work harder and try for better records—in the classroom, shop, club, and library.

The record of vocational preparation takes up an important—and large—spot on the card. The school shop teacher will be asked to fill in not only the training given (machine shop, electricity, carpentry, etc.) but also clock-hours spent in training, and whether the training was given under regular school programs, federal programs, or outside auspices, NYA, etc. In addition, the teacher will be asked to indicate the record of the pupil: "Recommended for job," "Grade B," "Succeeded in several home projects."

This is a peace-time tool; but especially useful in war. U.S. Commissioner of Education Studebaker says that this device should help civilian and military authorities to use manpower more efficiently. At the same time it should help the boy or girl to fit himself better in jobs and activities where he is most needed.

● Hearings on a new Federal Aid ($300,000,000) to Education bill (S. 637) are now in progress. Best guess is that the bill will not be approved. Your reporter, however, doesn't want to sound pessimistic. The bill would pass if, for example, *every* shop teacher in the country sat down and wrote a letter to his Congressman demanding approval of the measure!

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TO ALL SCHOOLS!

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